resinous matter no longer soluble in water, but now rendered soluble in alcohol, by a supposed union with oxygen derived from these acids.

Mr. Smithson being in possession of ulmin, sent to him from Palermo by the same person who had furnished M. Klaproth with the subject of his researches, has made various experiments, which lead to a different opinion of its nature from that which has been entertained.

When ulmin is dissolved in water, a dilute solution is yellow; but when concentrated, it is of a dark red, like blood. This solution slowly and feebly restores the colour of turnsol, after it has been reddened by an acid. Most acids occasion a copious precipitate from this solution of the matter which has been considered as resin. The solution, however, still retains a slight yellow colour, from a small quantity of this matter which remains dissolved. By evaporation of the solution a salt is obtained, consisting of potash combined with the acid employed in the experiment; and the quantity of potash, by various trials, amounted to about one fifth part of the weight of the ulmin.

The precipitate, when dried, is very glossy, and has a resinous appearance. In minute fragments it is found to be transparent, and of a deep garnet colour. It burns with flame, and is reduced to a white ash.

Alcohol does dissolve it, but very sparingly.

Water also dissolves a small quantity, and the solution seems to redden turnsol. Neither ammonia nor carbonate of soda promote its solution in water; but a small quantity of potash dissolves it immediately, and abundantly, and appears to regenerate ulmin, with all its original properties.

Hence Mr. Smithson infers, that ulmin is not a simple vegetable principle of anomalous qualities, but a combination of potash, with a matter more nearly allied to the extractives than to the resins.

The author has also investigated the properties of a substance obtained from the elm-tree in this country, which differed from that of Palermo in containing a redundant quantity of potash in the state of carbonate. He also made experiments on the sap of the elm-tree, from which, however, he did not succeed in obtaining ulmin.

On a Method of Freezing at a distance. By William Hyde Wollaston, *M.D. Sec. R.S.* Read December 17, 1812. [*Phil. Trans.* 1813, *p.* 71.]

The method here described by the author, is performed by means of an instrument, to which he gives the name of Cryophorus, expressing its office of frost-bearer. It consists of a tube, which may be two or three feet long, or even more, terminated by a ball at each end. One of these balls contains a small quantity of water to be frozen, and the rest of the instrument is as complete a vacuum as can be obtained.

In making this instrument, one of the balls terminates in a capillary

tube; and when water has been admitted into the other, it is boiled over a lamp till all the air is expelled; and while the stream is still issuing with violence through the capillary extremity, the end of it is held in the flame of the lamp, till in proportion as the force of the steam diminishes, the heat acquires power to seal the tube hermetically.

When such an instrument has been successfully exhausted, if the empty ball be placed in a freezing mixture of salt and snow, the water contained in the opposite ball will be frozen solid in a very few minutes.

The first vapour being condensed by the common effect of cold, is immediately succeeded by a fresh emission, with proportional reduction of temperature; so that heat is continually withdrawn, or cold generated at a distance by the freezing cause.

A Catalogue of North Polar Distances of some of the principal fixed Stars. By John Pond, *Esq. Astronomer Royal, F.R.S.* Read December 17, 1812. [*Phil. Trans.* 1813, *p.* 75.]

A Description of the solvent Glands and Gizzards of the Ardea Argala, the Casuarius Emu, and the long-legged Cassowary from New South Wales. By Sir Everard Home, *Bart. F.R.S.* Read December 17, 1812. [*Phil. Trans.* 1813, *p.* 77.]

In the first of these birds the solvent glands are different from those of any other bird examined by the author, each gland being made up of five or six cells, that open into one common excretory duct; but its gizzard is very similar to that of the crow.

In the Emu the solvent glands are oval bags, one fourth of an inch in length, and one sixteenth wide. The gizzard differs from that of the crow in having a thicker lining, and is remarkable solely for its situation; for it is not placed, as usual, between the stomach and the duodenum, but forms a pouch on one side, so that food can pass onwards direct into the duodenum, without being received into the gizzard.

In the Cassowary of New South Wales, the solvent glands are similar to those of the emu, but larger; and the gizzard is also similar in every respect, but stronger.

The author further remarks upon the circumstances in the structure of the cassowaries, and other birds most nearly allied to them, which adapt them to the different degrees of fertility of the countries they inhabit.

The Emu of Java, where there is abundance of food, has intestines that are of large diameter, and comparatively short, so as to afford free passage to the superfluity of food they take, and a gizzard to be employed only occasionally.

The Cassowary of New South Wales has intestines of smaller diameter, thirteen feet long; and a stronger gizzard, more frequently employed in a less productive country.